

frequencies between successive 15-minute intervals were not apparent except between the first three intervals. The wide confidence limits for certain of the 15-minute time intervals viz. sunrise to 15 minutes post sunrise, are due to a relatively few very long intervals between drums. During the early morning period prior to sunrise, birds at established drumming sites probably actively drum.

Apparently, birds established on drumming sites actively drum at regular frequencies during the period prior to sunrise. Most variation occurs after sunrise.

In intensive studies on small study areas where individual birds are located through repeated daily checks, the intensity of drumming is not a critical factor, although longer time intervals between drums make it easier to miss birds. On the other hand, when making roadside or other extensive counts in which the number of drums heard per unit time is the parameter used, it is obvious that surveys should be started an hour before sunrise.

The relationships between drumming behavior, population density and climatic conditions need much more study.

This study is a contribution from Pittman-Robertson Project W-117-R, Michigan.—WALTER L. PALMER, *Rose Lake Wildlife Research Station, Michigan Department of Conservation, Route 1, East Lansing, Mich. 48823, 17 February 1968.*

**Increase in Herring Gull colony in Cape May, New Jersey.**—Ornithologists have been interested in the southward movements of the Herring Gull (*Larus argentatus*) along the east coast of the U.S. (Hailman, *Auk*, 80:375, 1963; Bull, *Birds of the New York area*, Harper & Row, 1964). The interest stems from the question of what conflicts might occur when the Herring Gull establishes a new colony in an area where another species of Laridae has been nesting. If the two species compete for the same resources, we should expect by the competitive exclusion principle to see a local demise of one.

A profile of a typical coastal marsh in Cape May, New Jersey is given in Figure 1. The vegetation is mostly *Spartina alterniflora* (included also are: *S. patens*, *Salicornia* sp., and *Distichlis spicata*). In some places the Army Corps of Engineers dredged the intercoastal waterway pumping large quantities of sand and fill onto *Spartina* marshes. The resulting higher marsh table engenders subsequent succession of the vegetation to the woody bush *Iva* sp. (W. Bourn and C. Cottam, *Research Report 19*, Fish and Wildlife Service, 1950; E. Rosenwinkel, *Bull. New Jersey Acad. Sci.* 9:1-20, 1964).

For three summers (1964-1966) we studied the ecology and habitat responses of breeding Laughing Gulls (*Larus atricilla*) on Ring Island (39° 03' N, 74° 47' W), Cape May, New Jersey. The Laughing Gull colony is situated on the marsh covered by *S. alterniflora* and not on the higher fill areas. In 1964 we noted a few Herring Gulls circling over a stand of *Iva* on an island adjacent to Ring Island, but did not investigate. On 1 June 1965 we visited the stand of *Iva* and counted 17 Herring Gull nests. On 15 and 16 June a northeast storm hit the coast. Three study areas in the Laughing Gull colony containing 79, 36, and 516 nests lost respectively 100, 95 and 60 per cent of their nests. At the same time all the nests in the Herring Gull colony remained intact. The storm tide did not inundate the higher fill area as it did the lower *Spartina* marsh. Clearly, in a storm the Herring Gulls of this colony fared better than the neighboring Laughing Gulls. On 3 June 1966 we again visited the Herring Gulls and counted 42 nests. While recording their contents, we noted a higher proportion of clutches with three eggs (at the time about 10 per cent of the eggs had already hatched) compared to those of the Laughing Gulls ( $\chi^2 = 5.51$ ;  $P < 0.05$ ).

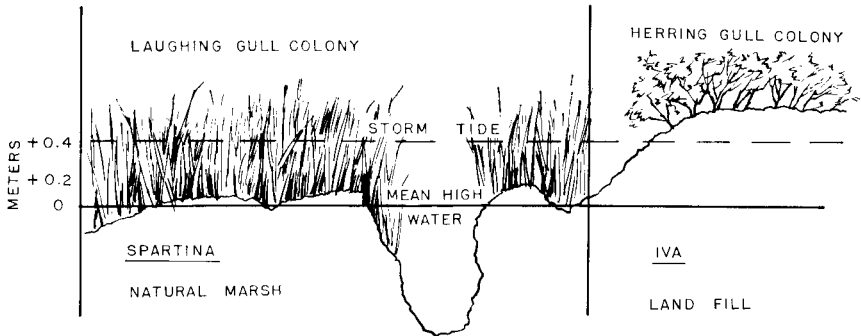


FIG. 1. A generalized profile of the salt marsh and land fill area in Cape May, New Jersey.

If the present trend is maintained this difference can become significant if the Herring Gull colony increases further. The greater number of clutches with three eggs among the Herring Gulls could result from higher initial productivity, reduced loss of nest contents or some combination of the two.

At present, we think the Herring Gulls are not yet in direct competition with Laughing Gulls for nesting habitat since the former build nests on higher sites (G. Nobel and M. Wurm, *Ann. New York Acad. Sci.* 45:179-220, 1943 reported similar findings for those two species on Muskeget Island, Mass.) while the latter are exploiting the lower *Spartina* marsh. However, and this is of consequence, changes wrought by man either in dredging or filling usually result in destruction of prime marshes (*Spartina*) for the Laughing Gull and an increase in the areas which support *Iva* thus laying open the possibility of more Herring Gull intrusion. As yet there was little evidence of predation by Herring Gulls on the Laughing Gull colony, nor any evidence of food competition.

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**Barred Owl feeds on crow.**—On 2 December, 1965, at about 07:00 I found on the highway near Plainfield, Wisconsin a dead Barred Owl (*Strix varia*) and about 12 feet away a dead Common Crow (*Corvus brachyrhynchos*). Although sunrise occurred at about 07:14 it was still quite dark since the sky was completely overcast and thick ground fog existed. I had passed there on the previous night at about 22:00 and neither of these birds was on the road at that time. At this point along the highway there are pine plantations on both sides of the road offering many possible roosting sites for crows.

It appeared as though the birds were killed at or at about the same time. The owl was limp, still warm, and showed little external damage. It had 63 grams of crow in its stomach. The crow was badly damaged and due to a much exposed and flattened surface area was no longer warm. The exposed tissue of the crow was not frozen, however, and the freshness of the blood indicated it had been recently killed. The temperature at the Stevens Point Municipal Airport, 20 miles north, at 06:40 was 27° F.